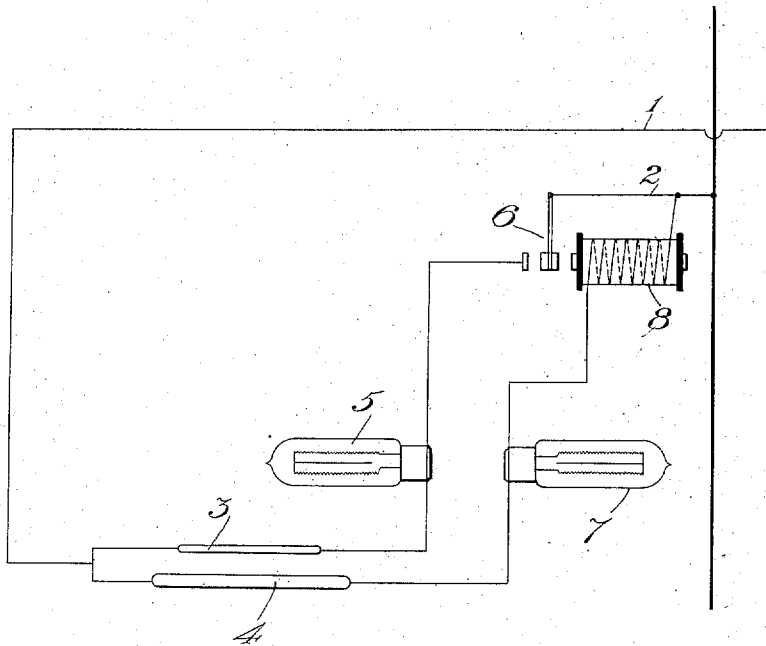


W. D. UPTGRAFF.
APPARATUS FOR ELECTRIC LIGHTING.
APPLICATION FILED MAY 26, 1909.

1,044,950.

Patented Nov. 19, 1912.



WITNESSES:

W. D. Uptgraff
Geo. H. Walcott

INVENTOR.

BY *Walter D. Uptgraff*
Geo. H. Walcott
HIS ATTORNEY IN FACT.

UNITED STATES PATENT OFFICE.

WALTER D. UPTGRAFF, OF PITTSBURGH, PENNSYLVANIA.

APPARATUS FOR ELECTRIC LIGHTING.

1,044,950.

Specification of Letters Patent.

Patented Nov. 19, 1912.

Application filed May 26, 1909. Serial No. 498,513.

To all whom it may concern:

Be it known that I, WALTER D. UPTGRAFF, a citizen of the United States, and resident of Pittsburgh, county of Allegheny, State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Electric Lighting, of which the following is a specification.

My invention relates to a class of apparatus in which an illuminant or glower is employed which does not readily conduct current when subjected to normal differences of potential but which can be rendered conductive by heating. It has been found that certain materials can be made to conduct an electric current under the influence of a very high difference of potential, or if heated can be made to receive current under a lower difference of potential. In general, it may be stated that a glower of very high efficiency can be made which will require either to be started by preliminary heating or by the application of a very high difference of potential, and that if the proper modifications be made in its structure to permit it to start at a lower difference of potential, the efficiency is liable to be materially lessened.

My invention involves the use of two or more glowers having different starting characteristics, so arranged that the glower starting under the lowest difference of potential will be the first traversed by an electric current and give a preliminary lighting and by imparting heat to the adjacent glower which is adapted to receive current only when heated or subjected to a higher difference of potential than normal, whereupon the current under the normal difference of potential will traverse the second glower, and usually the current flow through the first glower is then automatically interrupted. In the event that it is desired to continue the series beyond two, the same operation is repeated until the glower affording the maximum efficiency, as well as offering the greatest resistance to starting, is traversed by the current.

It has been found that a glower made for instance of a mixture of approximately 90% of yttria and 10% of tungstic oxid prepared and formed into glowers according to the method now commonly employed in the manufacture of so-called Nernst glowers, will receive current, while it is still in a cold state, if an adequate differ-

ence of potential is applied to its terminals. For instance, a glower of this character may be made which will start, upon the application of 800 volts, but when heated by the flow of current the voltage required to maintain it in a conducting state may fall as low as 200 volts or less. Likewise, the proportions of the glower, and also the proportions of the ingredients, may be modified to produce a glower which will start upon much lower voltages, say, 100 volts or less. By placing the glower which will start, say, upon, 200 volts in parallel circuit with the one starting on 800 volts, the heat developed in the former may be imparted to the latter and when thus heated the 800 volt glower is brought into a condition to be started by the application of the 200 volts' difference of potential, whereupon the first named glower may be cut out of circuit.

It is to be understood that the foregoing mixture of materials is named merely as illustrative, and that other materials of suitable characteristics may be employed.

In the accompanying drawing, I have illustrated a method of applying the invention.

Referring to the drawing, 1 and 2 represent conductors of an electric circuit supplied with current at, say, 200 volts.

3 and 4 respectively, represent glowers. The glower 3, is capable of taking current when the difference of potential existing upon the line is, say, 200 volts. The glower 4, however, requires in order to start it, either a very much higher potential say, 800 volts, or else requires to be heated, whereupon it will be traversed by a voltage of 200. The glower 3 is connected in circuit through a suitable ballast, 5, and a cut-out device 6, while the glower 4 is connected across the circuit through a ballast, 7, and the magnet 8, of the cut-out device 6. When current is caused to flow through the glower 3, it will impart heat to the glower 4, which, when it becomes conductive at an electro-motive force of 200, will receive current and automatically cut the glower 3 out of circuit.

I claim as my invention:

1. The combination of two or more glowers having substantially equal light-emitting qualities and different starting characteristics, means for starting one of the glowers by the influence of a given difference of potential, imparting heat from that glower to a glower requiring a higher

starting voltage when cold, and means for cutting the first glower out of circuit by the action of the current flow through the second glower.

5 2. In an electric lighting device, the combination of two bodies for use as light-emitting glowers, one having a normal starting resistance greater than the other, said glowers being located within heat radiating
10 proximity.

3. The combination of two glowers having high light-emitting qualities and different critical starting voltages in heat radiating relation one with the other and means
15 for cutting the one having the lower critical voltage out of circuit by the action of current traversing the one having the higher critical voltage.

4. The combination of a glower having high light-emitting qualities and a critical
20 starting voltage, means for applying to its terminals a voltage sufficient to start a current flow therethrough, a second glower having as high light-emitting qualities and
25 a higher starting voltage located in heat radiating distance from the first named glower and means for cutting the first named glower out of circuit by the action of current traversing the second glower.

Signed at Pittsburgh, in the county of Allegheny, and State of Pennsylvania, this
30 24th day of May, A. D. 1909.

WALTER D. UPTGRAFF.

Witnesses:

GEO. J. TAYLOR,
M. K. GARRETT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Corrections in Letters Patent No. 1,044,950.

It is hereby certified that in Letters Patent No. 1,044,950, granted November 19, 1912, upon the application of Walter D. Uptegraff, of Pittsburgh, Pennsylvania, for an improvement in "Apparatus for Electric Lighting," errors appear in the printed specification requiring correction as follows: Page 1, line 73, for the article "the" read *be*; same page, line 74, after the word "volts" strike out the apostrophe; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of December, A. D., 1912.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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